OCT 12 2005
IAP13
PATENT & TRADEMARK OFFICE

FIG. 1

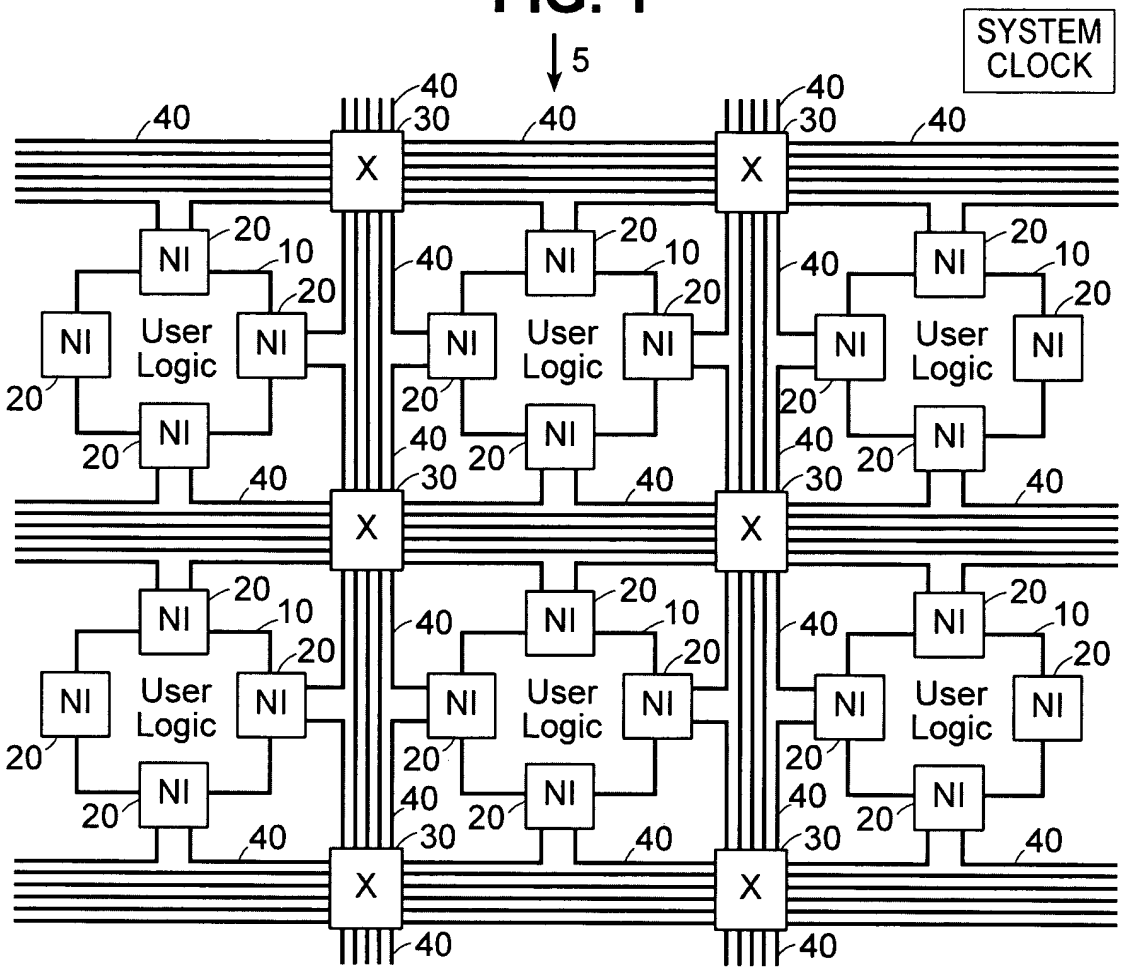


FIG. 2

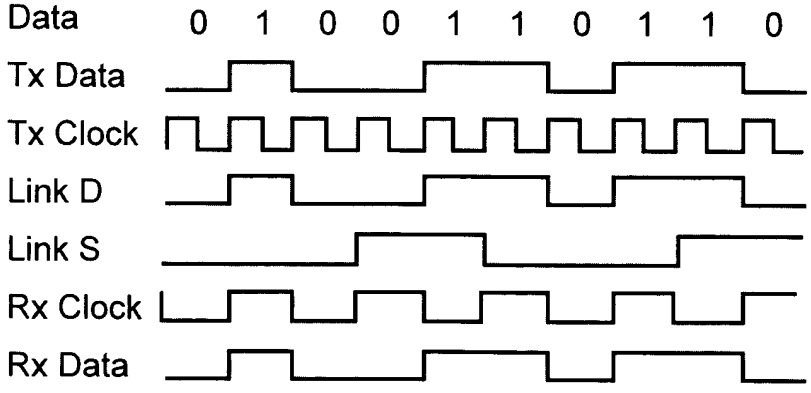


FIG. 3

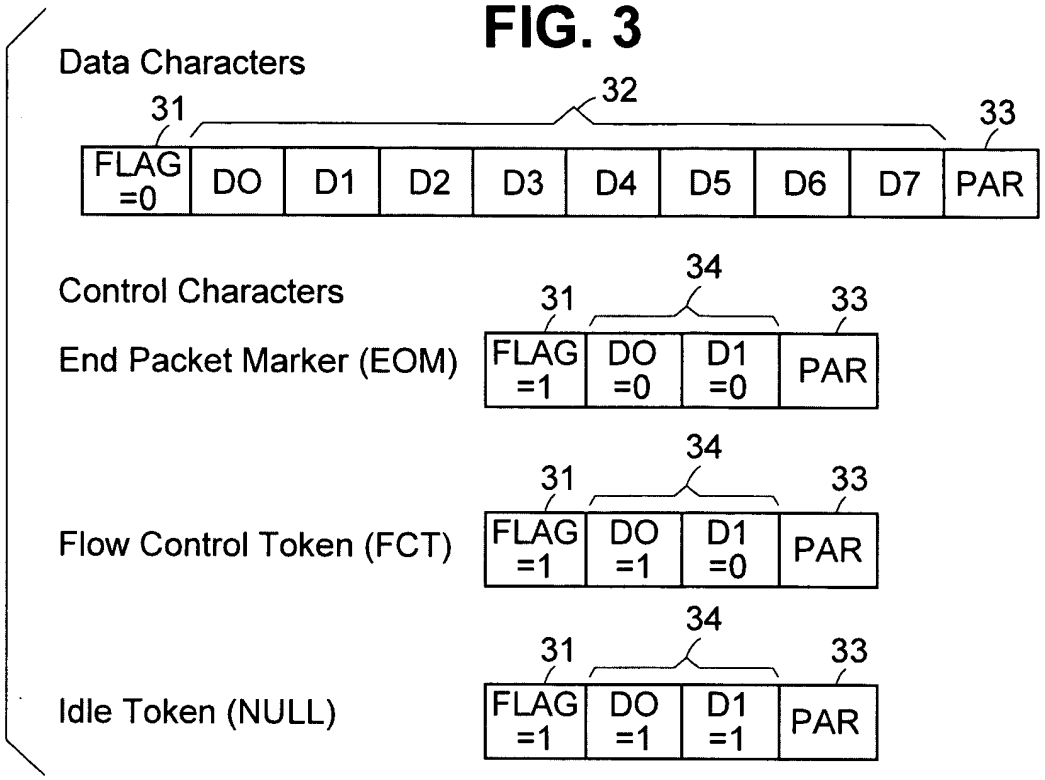

Data Characters
31
32
33
FLAG =0
DO
D1
D2
D3
D4
D5
D6
D7
PAR
Control Characters
End Packet Marker (EOM)
34
FLAG =1
DO =0
D1 =0
Flow Control Token (FCT)
DO =1
D1 =0
Idle Token (NULL)
D1 =1

FIG. 4

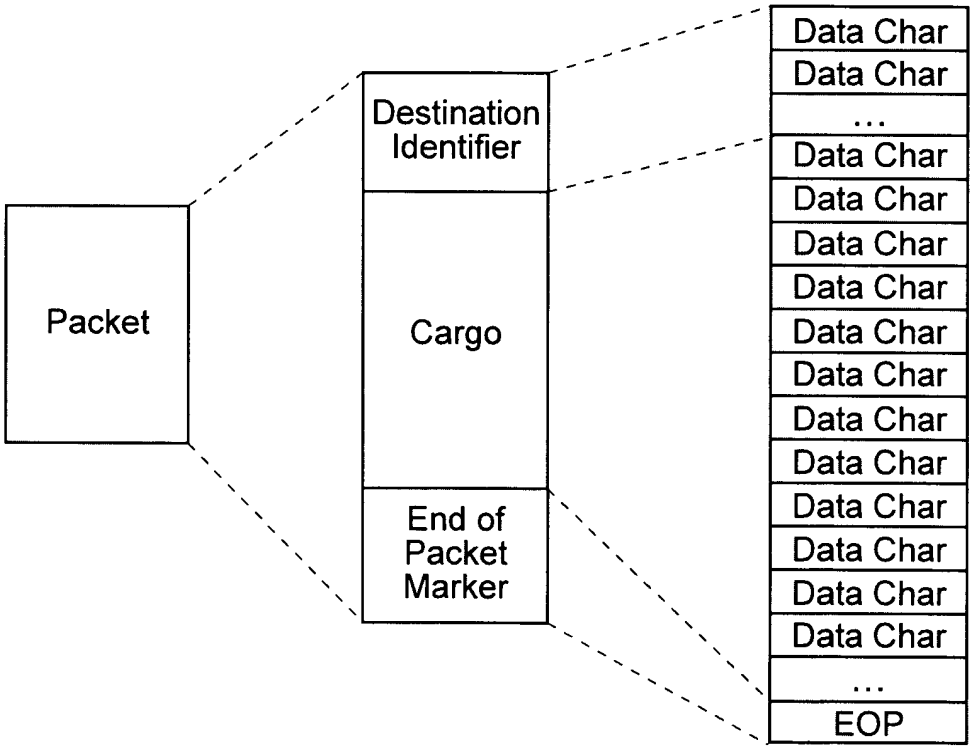

Packet
Destination Identifier
Cargo
End of Packet Marker
Data Char
...
EOP

FIG. 5

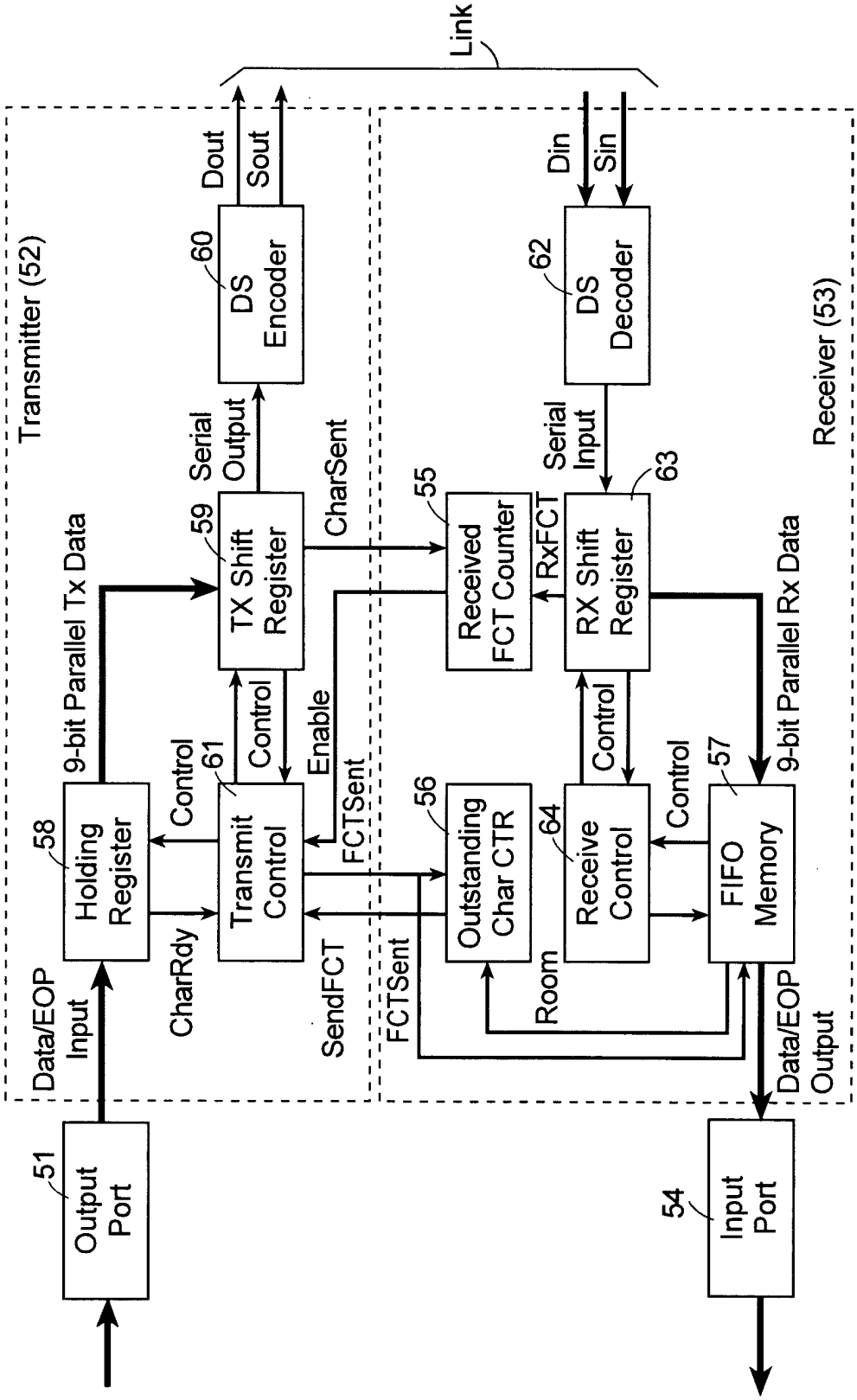

Link
Transmitter (52)
Receiver (53)
Dout
Sout
Din
Sin
60
DS Encoder
62
DS Decoder
Serial Output
Serial Input
CharSent
59
TX Shift Register
55
Received FCT Counter
RxFCT
63
RX Shift Register
9-bit Parallel Tx Data
9-bit Parallel Rx Data
Control
61
Enable
FCTSent
Control
57
58
Holding Register
Transmit Control
56
Outstanding Char CTR
64
Receive Control
FIFO Memory
Data/EOP Input
CharRdy
SendFCT
FCTSent
Room
Data/EOP Output
51
Output Port
54
Input Port

FIG. 6

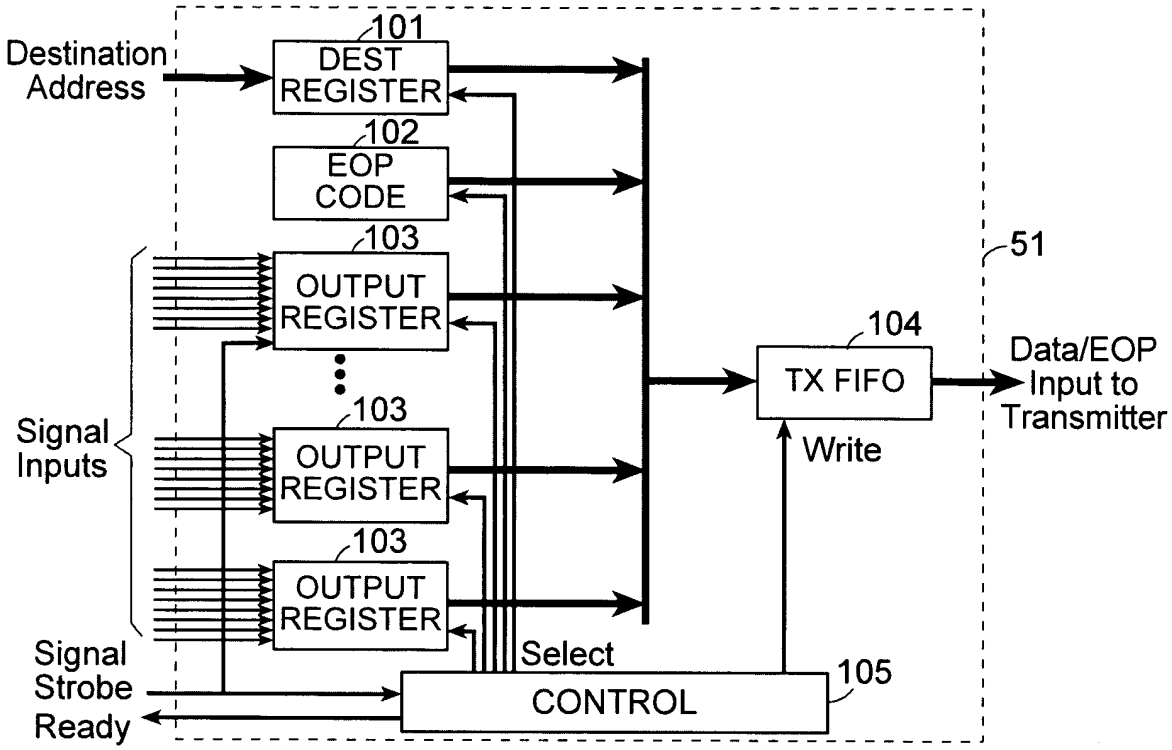

Destination Address
101
DEST REGISTER
102
EOP CODE
103
OUTPUT REGISTER
103
OUTPUT REGISTER
103
OUTPUT REGISTER
Signal Inputs
51
104
TX FIFO
Data/EOP Input to Transmitter
Write
Signal Strobe
Ready
Select
105
CONTROL

FIG. 7

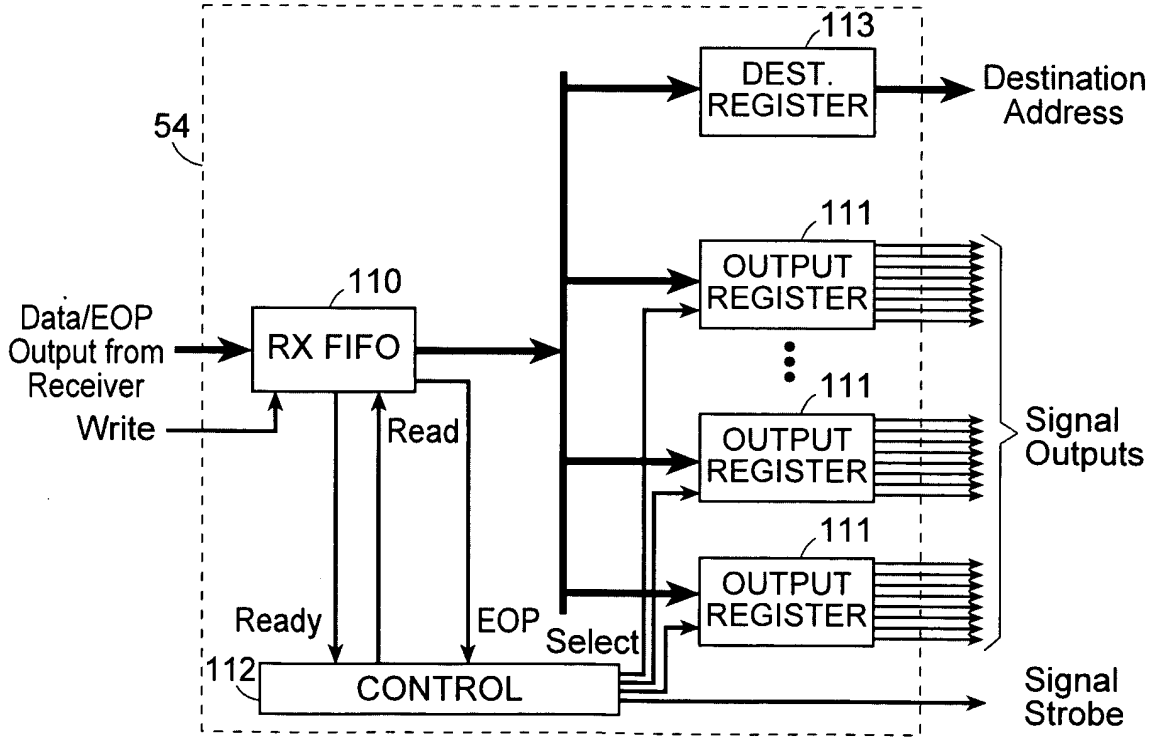

54
113
DEST. REGISTER
Destination Address
111
OUTPUT REGISTER
110
RX FIFO
Data/EOP Output from Receiver
Write
Read
111
OUTPUT REGISTER
Signal Outputs
111
OUTPUT REGISTER
Ready
EOP
Select
112
CONTROL
Signal Strobe

FIG. 8

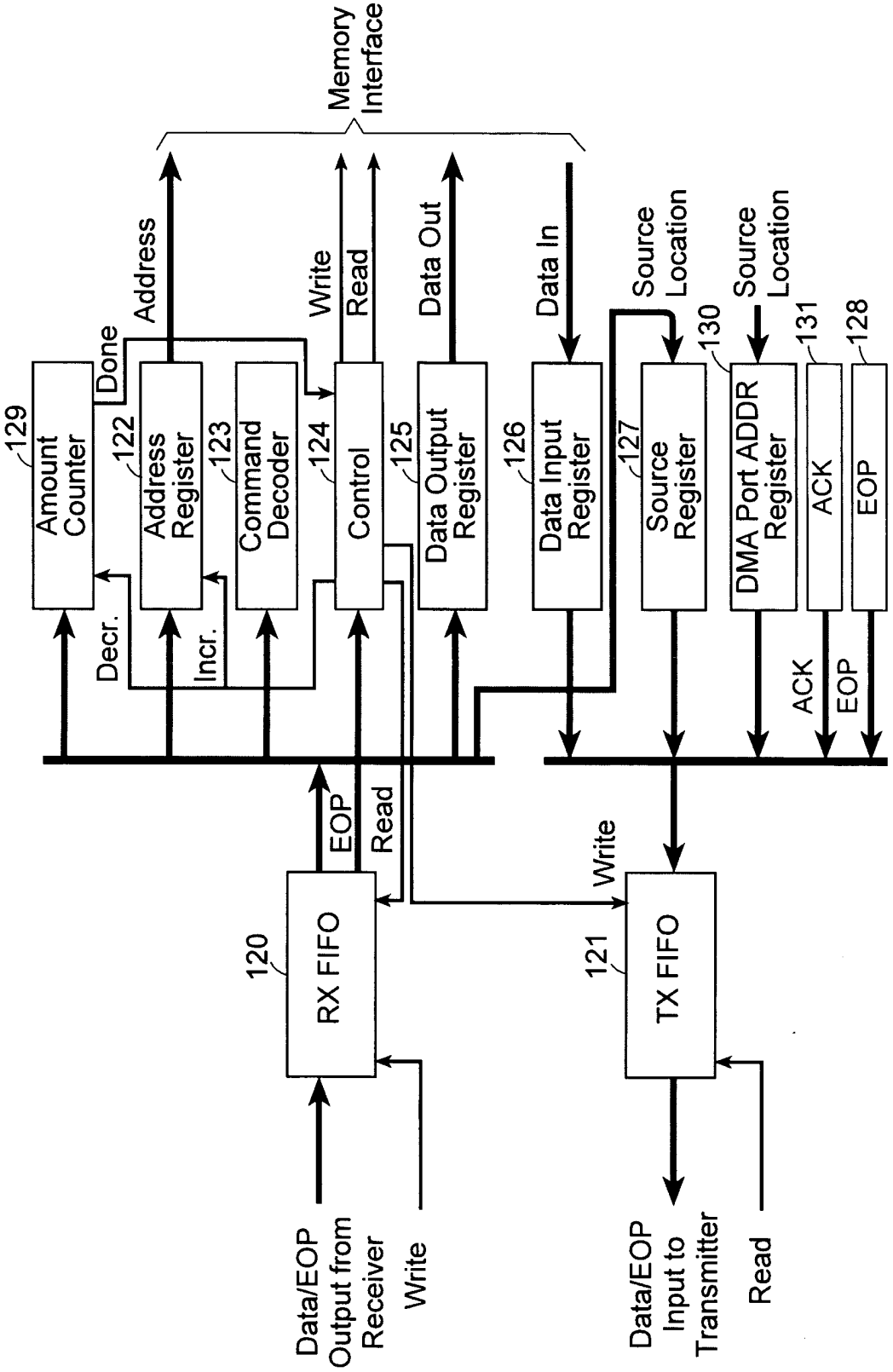

Memory Interface
Address
Write
Read
Data Out
Data In
Source Location
Source Location
Done
129
Amount Counter
122
Address Register
123
Command Decoder
124
Control
125
Data Output Register
126
Data Input Register
127
Source Register
130
DMA Port ADDR Register
131
ACK
128
EOP
Decr.
Incr.
ACK
EOP
EOP
Read
Write
120
RX FIFO
121
TX FIFO
Data/EOP Output from Receiver
Write
Data/EOP Input to Transmitter
Read

FIG. 9

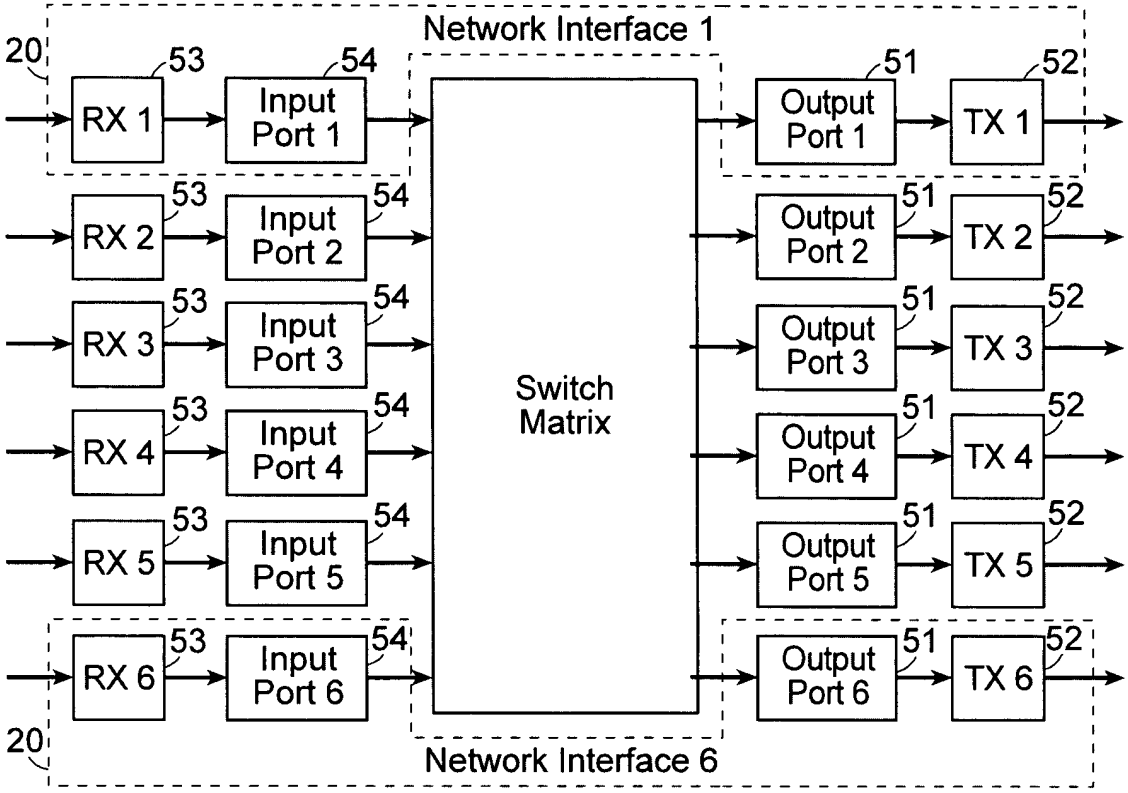

Network Interface 1
20
RX 1
53
Input Port 1
54
Output Port 1
51
TX 1
52
RX 2
Input Port 2
Output Port 2
TX 2
RX 3
Input Port 3
Output Port 3
TX 3
RX 4
Input Port 4
Output Port 4
TX 4
RX 5
Input Port 5
Output Port 5
TX 5
RX 6
Input Port 6
Output Port 6
TX 6
Switch Matrix
20
Network Interface 6

FIG. 10

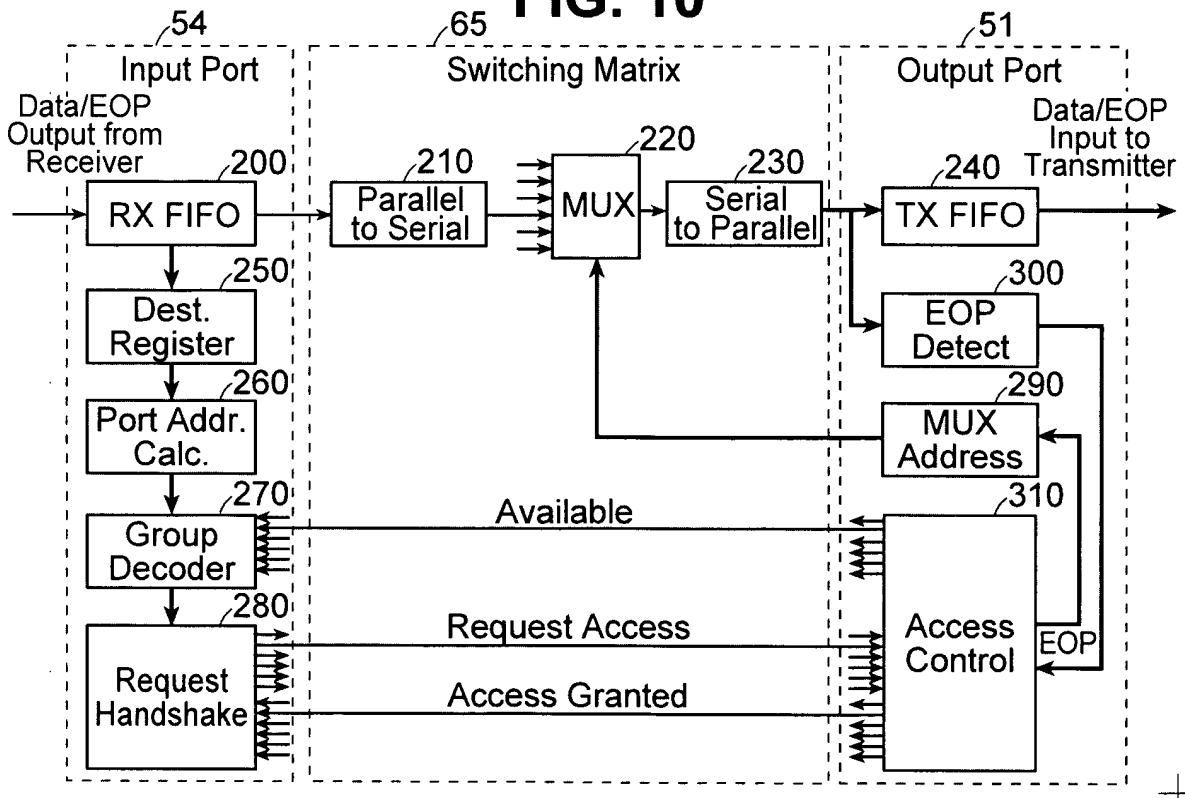

54
Input Port
65
Switching Matrix
51
Output Port
Data/EOP Output from Receiver
Data/EOP Input to Transmitter
RX FIFO
200
Parallel to Serial
210
MUX
220
Serial to Parallel
230
TX FIFO
240
Dest. Register
250
EOP Detect
300
Port Addr. Calc.
260
MUX Address
290
Group Decoder
270
Available
310
Request Handshake
280
Request Access
Access Granted
Access Control
EOP

FIG. 11

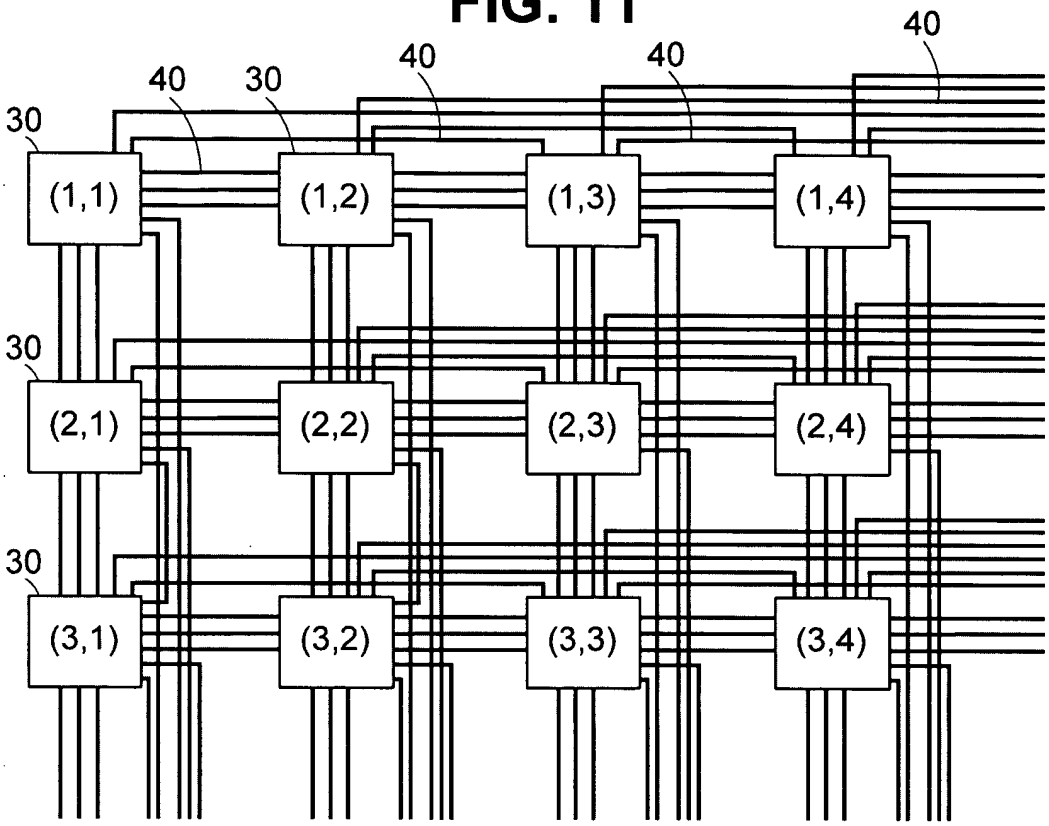

40
40
30
40
40
40
30
(1,1)
(1,2)
(1,3)
(1,4)
30
(2,1)
(2,2)
(2,3)
(2,4)
30
(3,1)
(3,2)
(3,3)
(3,4)

FIG. 12

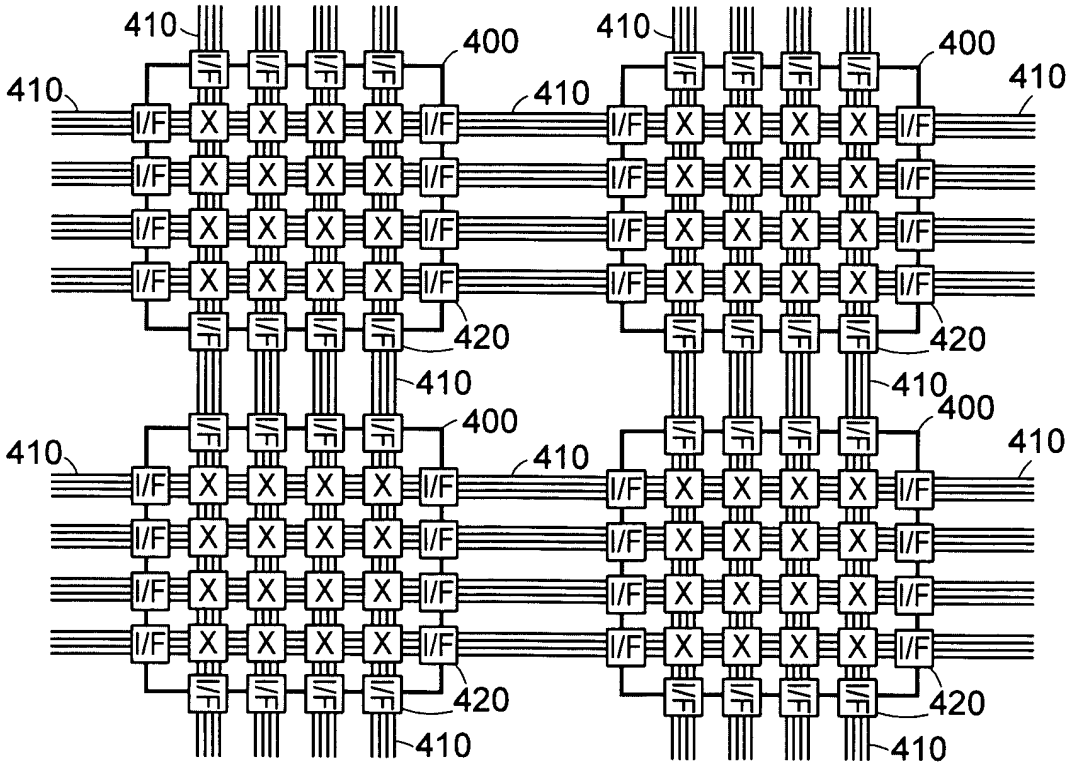

410
400
410
410
400
410
I/F
X
420
410
400
410
410
400
410
420
410

FIG. 13

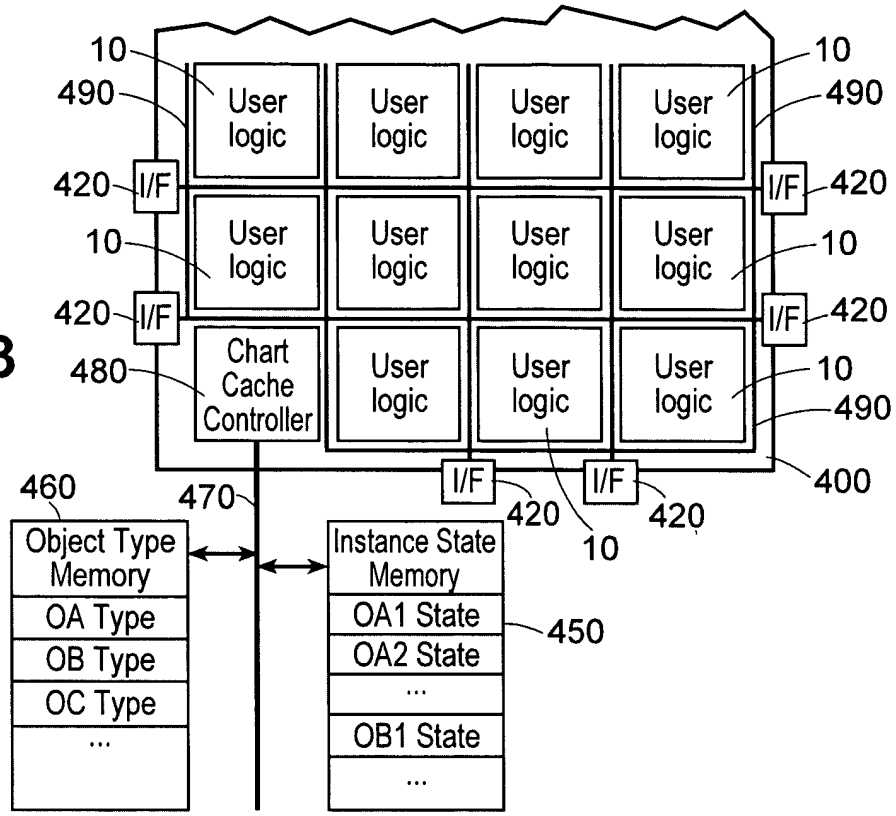

10
490
User logic
420
I/F
480
Chart Cache Controller
400
460
470
Object Type Memory
OA Type
OB Type
OC Type
Instance State Memory
OA1 State
OA2 State
OB1 State
450

FIG. 14

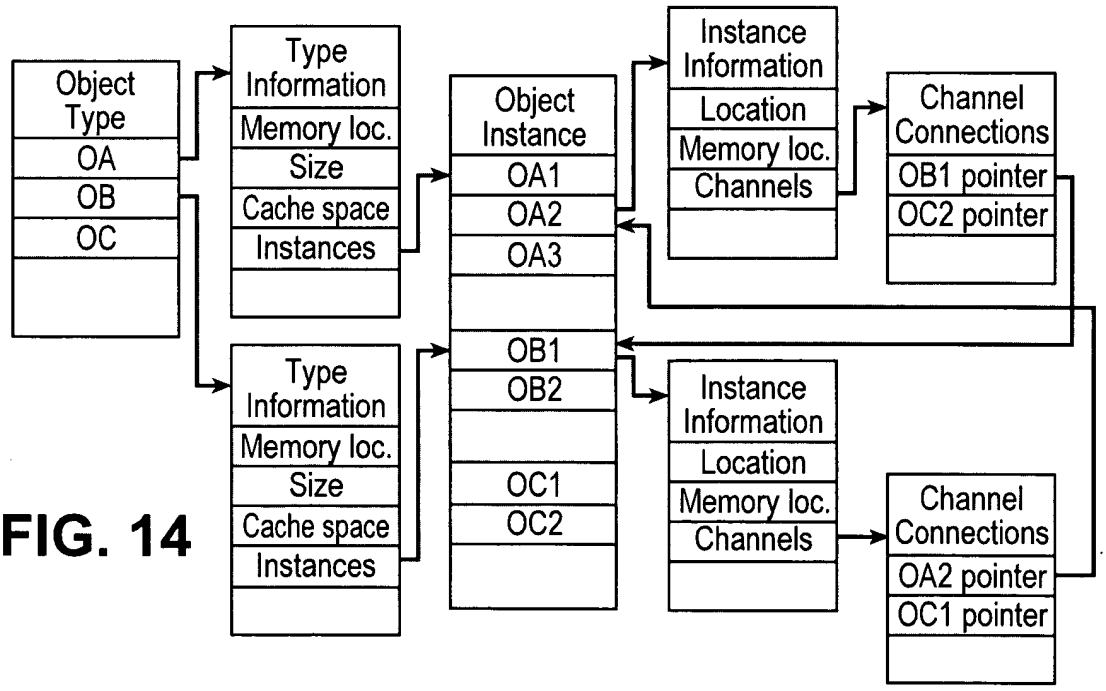

Object Type
OA
OB
OC
Type Information
Memory loc.
Size
Cache space
Instances
Object Instance
OA1
OA2
OA3
OB1
OB2
OC1
OC2
Instance Information
Location
Memory loc.
Channels
Channel Connections
OB1 pointer
OC2 pointer
OA2 pointer
OC1 pointer

FIG. 15

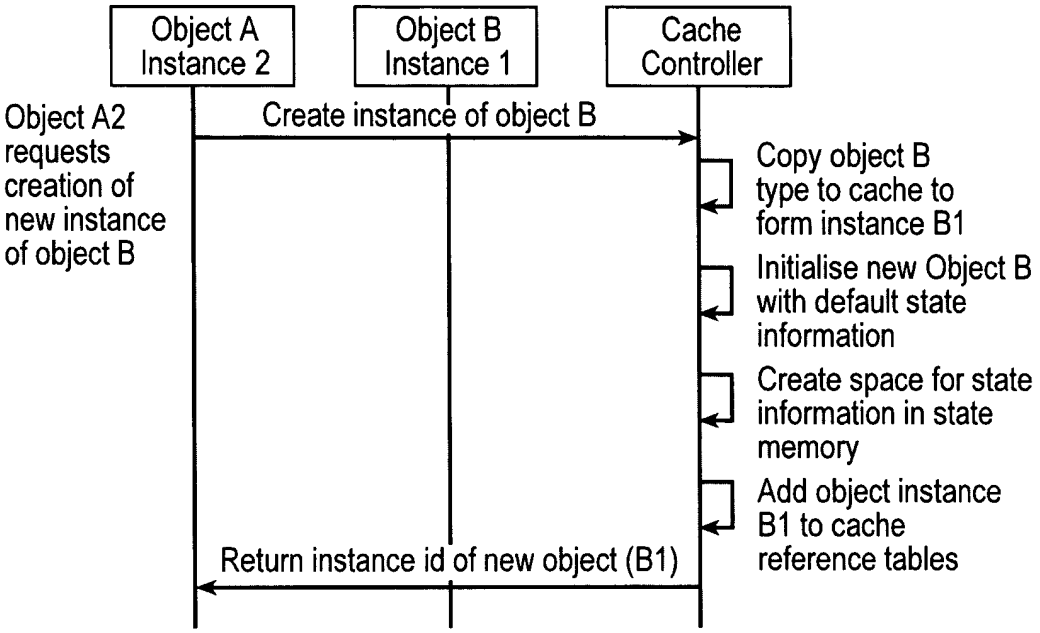

Object A Instance 2
Object B Instance 1
Cache Controller
Object A2 requests creation of new instance of object B
Create instance of object B
Copy object B type to cache to form instance B1
Initialise new Object B with default state information
Create space for state information in state memory
Add object instance B1 to cache reference tables
Return instance id of new object (B1)

FIG. 16

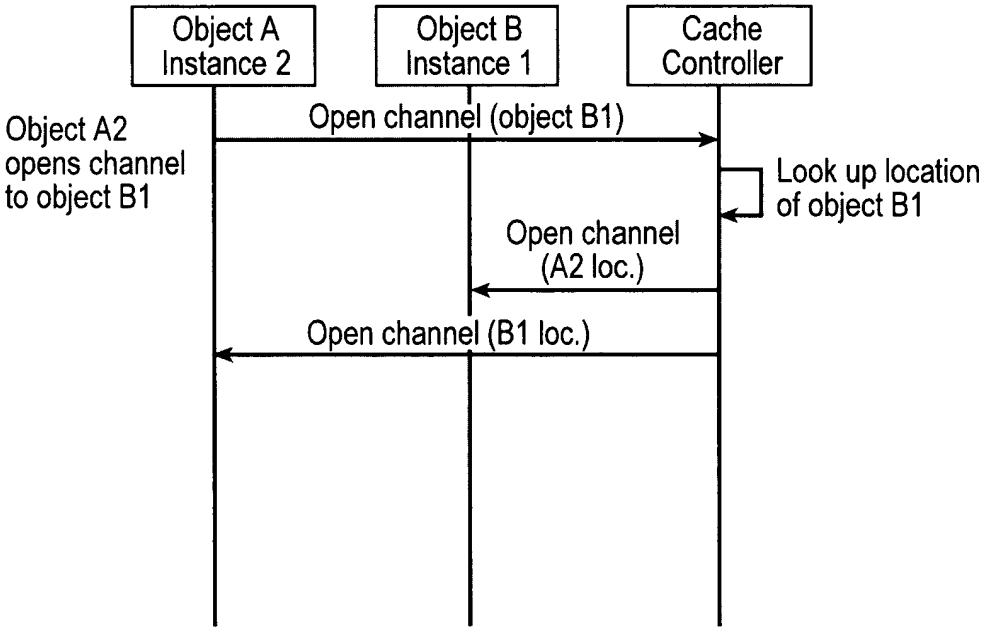

Object A Instance 2
Object B Instance 1
Cache Controller
Object A2 opens channel to object B1
Open channel (object B1)
Look up location of object B1
Open channel (A2 loc.)
Open channel (B1 loc.)

FIG. 17

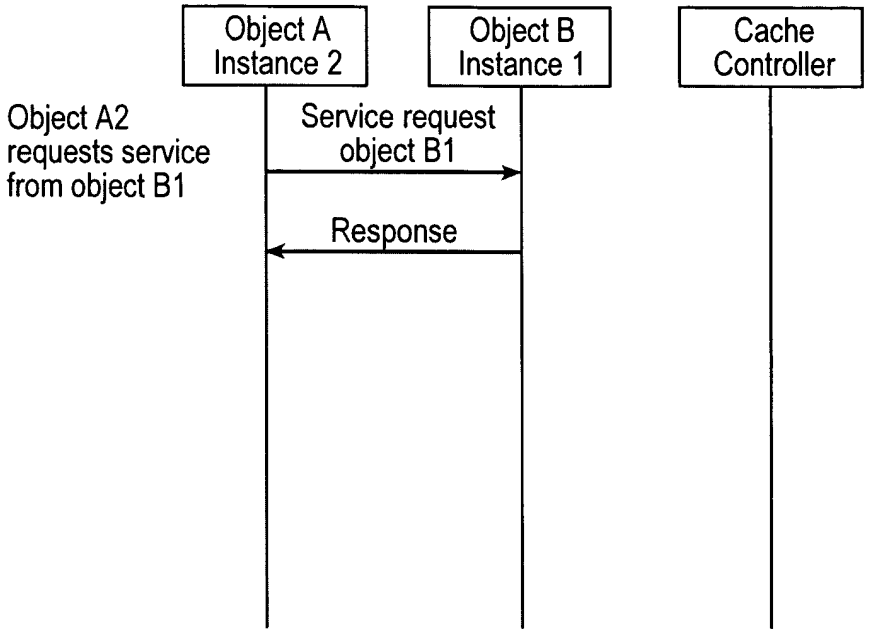

Object A
Instance 2
Object B
Instance 1
Cache
Controller
Object A2
requests service
from object B1
Service request
object B1
Response

FIG. 18

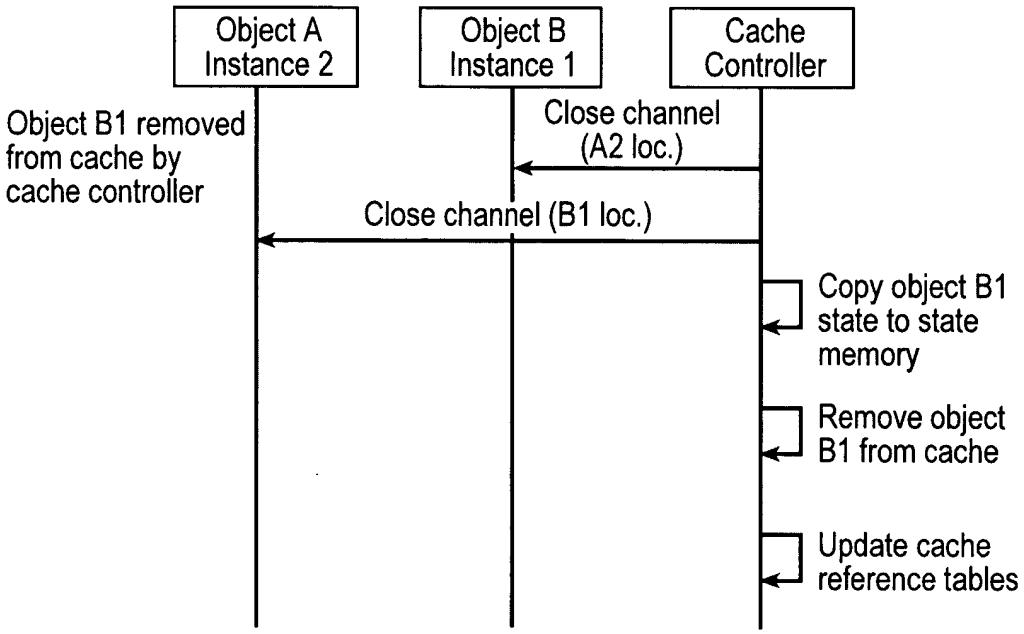

Object A
Instance 2
Object B
Instance 1
Cache
Controller
Object B1 removed
from cache by
cache controller
Close channel
(A2 loc.)
Close channel (B1 loc.)
Copy object B1
state to state
memory
Remove object
B1 from cache
Update cache
reference tables

FIG. 19

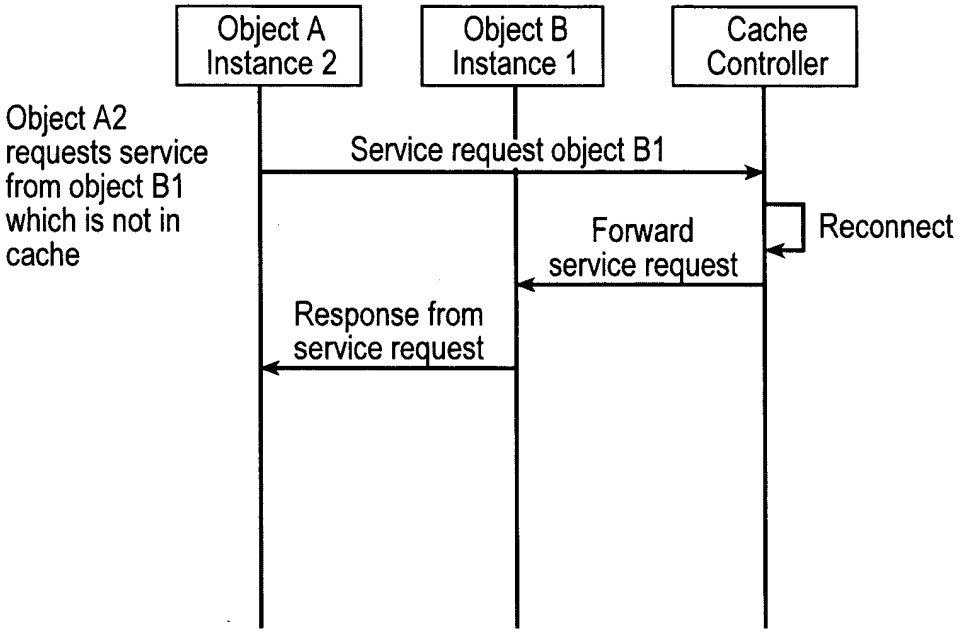

Object A Instance 2
Object B Instance 1
Cache Controller
Object A2 requests service from object B1 which is not in cache
Service request object B1
Reconnect
Forward service request
Response from service request

FIG. 20

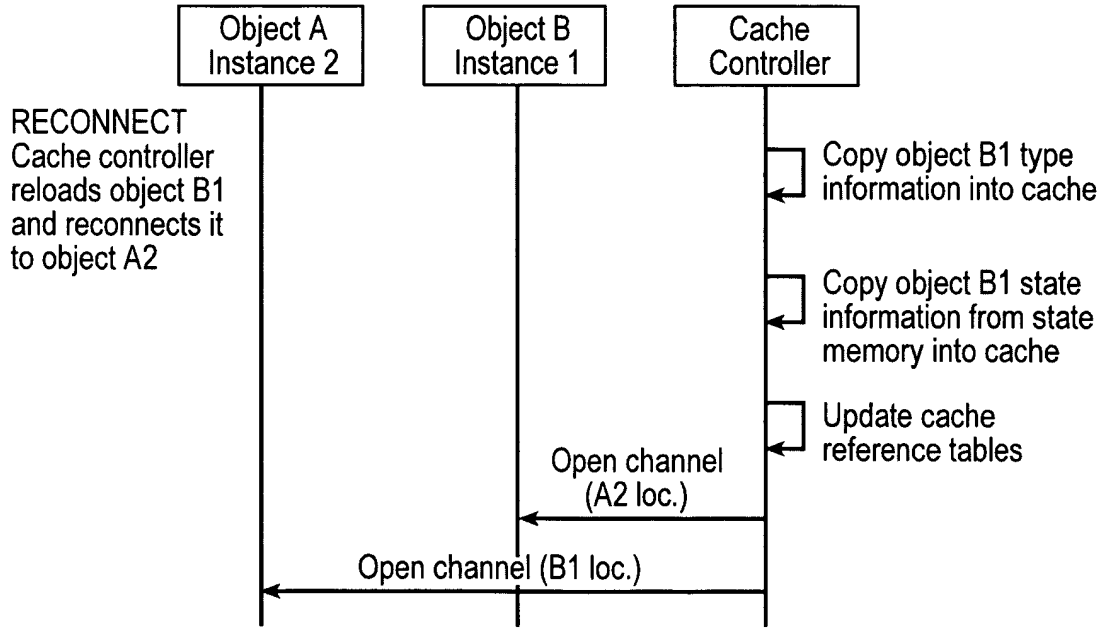

Object A Instance 2
Object B Instance 1
Cache Controller
RECONNECT Cache controller reloads object B1 and reconnects it to object A2
Copy object B1 type information into cache
Copy object B1 state information from state memory into cache
Update cache reference tables
Open channel (A2 loc.)
Open channel (B1 loc.)

FIG. 21

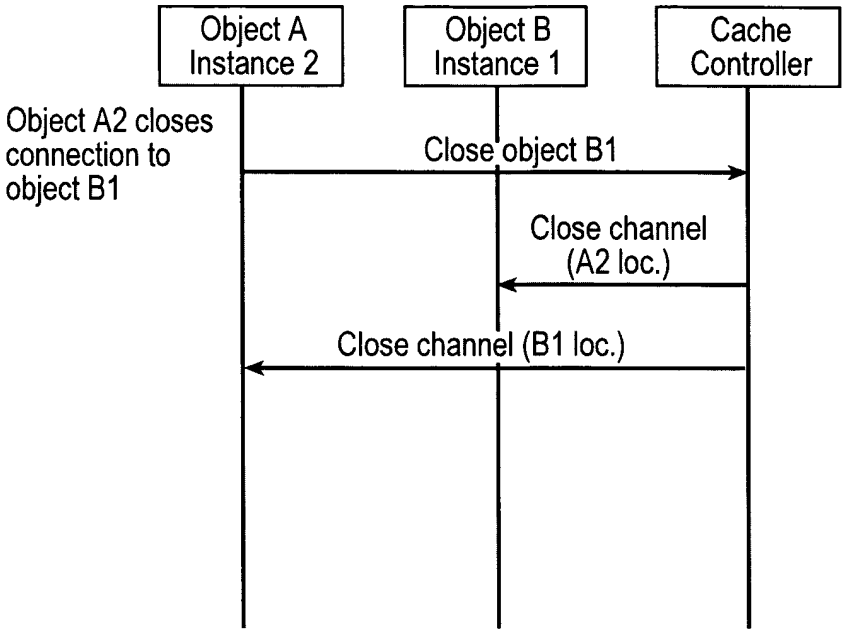

Object A Instance 2
Object B Instance 1
Cache Controller
Object A2 closes connection to object B1
Close object B1
Close channel (A2 loc.)
Close channel (B1 loc.)

FIG. 22

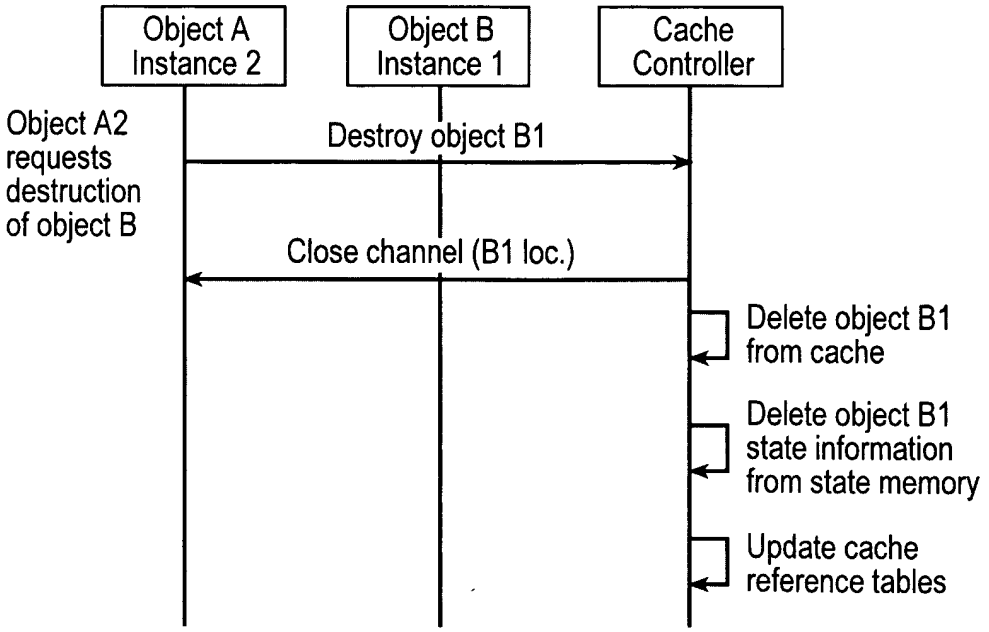

Object A Instance 2
Object B Instance 1
Cache Controller
Object A2 requests destruction of object B
Destroy object B1
Close channel (B1 loc.)
Delete object B1 from cache
Delete object B1 state information from state memory
Update cache reference tables

FIG. 23

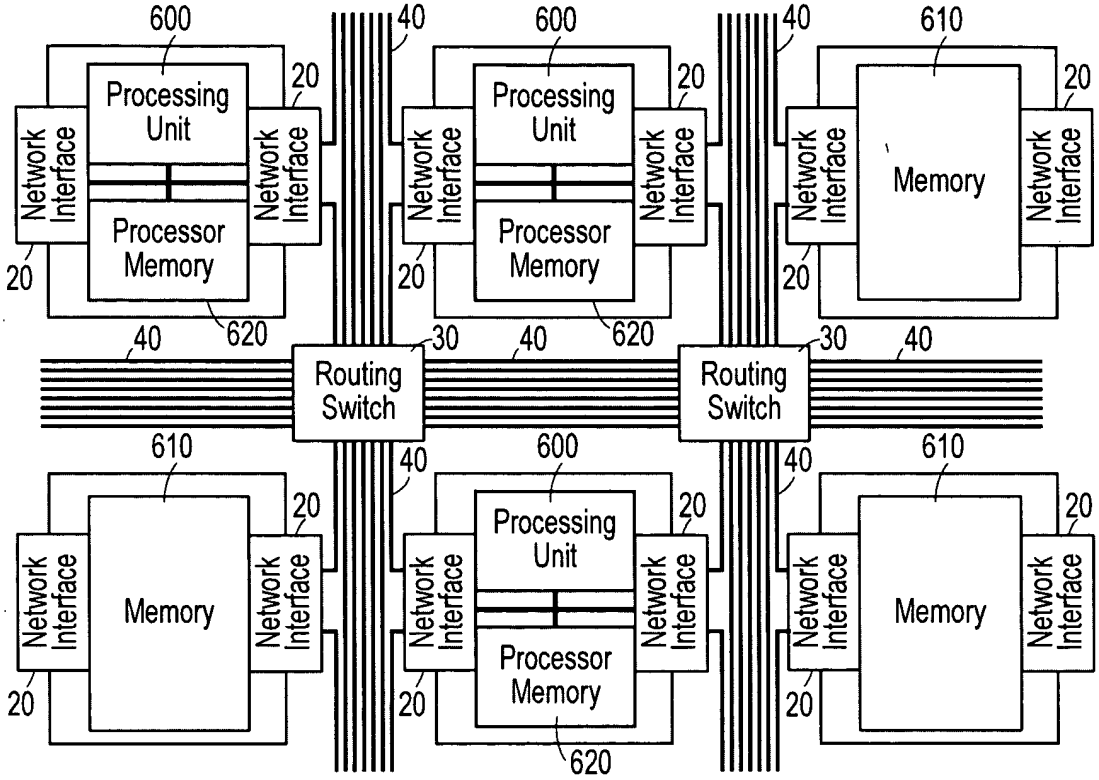
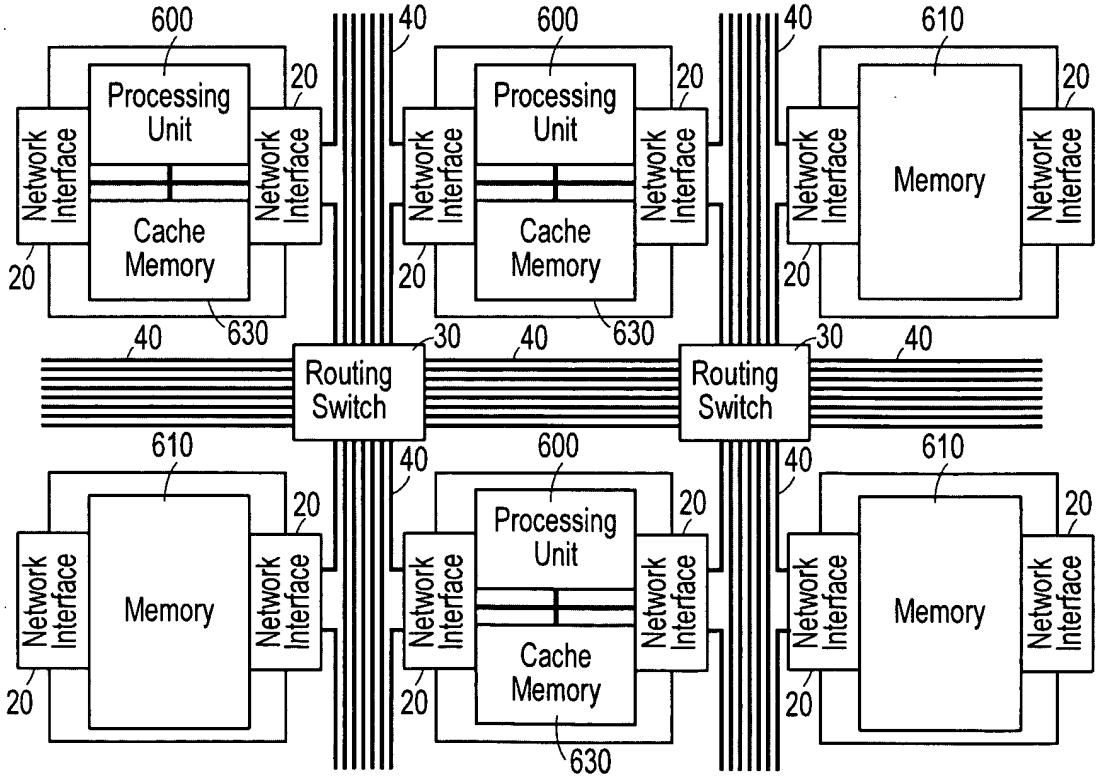

600
Processing Unit
Processor Memory
620
610
Memory
Network Interface
20
40
30
Routing Switch

FIG. 24


600
Processing Unit
Cache Memory
630
610
Memory
Network Interface
20
40
30
Routing Switch